

Claims

- [c1] An electrophoretic medium comprising at least one electrically charged particle suspended in a suspending fluid and capable of moving through the fluid on application of an electrical field to the fluid, wherein the at least one electrically charged particle comprises copper chromite.
- [c2] An electrophoretic medium according to claim 1 wherein the at least one electrically charged particle has an average diameter of from about 0.25 to about 5 μm .
- [c3] An electrophoretic medium according to claim 1 wherein the at least one electrically charged particle is coated with silica.
- [c4] An electrophoretic medium according to claim 1 wherein the at least one electrically charged particle has a polymer chemically bonded to, or cross-linked around, the at least one particle.
- [c5] An electrophoretic medium according to claim 4 wherein the polymer is chemically bonded to the at least one particle.
- [c6] An electrophoretic medium according to claim 5 wherein

the polymer comprises from about 5 to about 500 mg m⁻² of the surface area of the at least one particle.

[c7] An electrophoretic medium according to claim 6 wherein the polymer comprises from about 10 to about 100 mg m⁻² of the surface area of the at least one particle.

[c8] An electrophoretic medium according to claim 7 wherein the polymer comprises from about 20 to about 100 mg m⁻² of the surface area of the at least one particle.

[c9] An electrophoretic medium according to claim 6 wherein the polymer comprises from about 2 to about 8 per cent by weight of the at least one particle.

[c10] An electrophoretic medium according to claim 5 wherein the polymer comprises charged or chargeable groups.

[c11] An electrophoretic medium according to claim 10 wherein the polymer comprises amino groups.

[c12] An electrophoretic medium according to claim 5 wherein the polymer comprises a main chain and a plurality of side chains extending from the main chain, each of the side chains comprising at least about four carbon atoms.

[c13] An electrophoretic medium according to claim 5 wherein the polymer is formed from an acrylate or a methacrylate.

- [c14] An electrophoretic medium according to claim 3 wherein the at least one particle has a polymer chemically bonded to the silica coating.
- [c15] An electrophoretic medium according to claim 5 wherein the polymer is bonded to the at least one particle via a residue of a functionalization agent.
- [c16] An electrophoretic medium according to claim 15 wherein the functionalization agent comprises a silane.
- [c17] An electrophoretic medium according to claim 15 wherein the residue of the functionalization agent comprises charged or chargeable groups.
- [c18] An electrophoretic medium according to claim 1 further comprising at least one second particle having at least one optical characteristic differing from that of the copper chromite particle(s), the at least one second particle also having an electrophoretic mobility differing from that of the copper chromite particle(s).
- [c19] An electrophoretic medium according to claim 18 wherein the copper chromite particle(s) and the second particle(s) bear charges of opposite polarity.
- [c20] An electrophoretic medium according to claim 18 wherein the second particle(s) are substantially white.

- [c21] An electrophoretic medium according to claim 20 wherein the second particle(s) comprise titania.
- [c22] An electrophoretic medium according to claim 1 wherein the suspending fluid comprises a hydrocarbon, or a mixture of a hydrocarbon and a halogenated hydrocarbon.
- [c23] An electrophoretic medium according to claim 1 further comprising a capsule wall within which the suspending fluid and the at least one particle are retained.
- [c24] An electrophoretic medium according to claim 23 comprising a plurality of capsules each comprising a capsule wall and the suspending fluid and at least one particle retained therein, the medium further comprising a polymeric binder surrounding the capsules.
- [c25] An electrophoretic display comprising an electrophoretic medium according to claim 1 and at least one electrode disposed adjacent the electrophoretic medium for applying an electric field to the medium.
- [c26] An electrophoretic display according to claim 25 wherein the electrophoretic medium comprises a plurality of capsules.
- [c27] An electrophoretic display according to claim 25 wherein the electrophoretic medium comprises a plurality of

droplets comprising the suspending fluid and a continuous phase of a polymeric material surrounding the droplets.

- [c28] An electrophoretic display according to claim 25 wherein the electrophoretic medium comprises a substrate having a plurality of sealed cavities formed therein, and the suspending fluid and the copper chromite particles are retained within the sealed cavities.
- [c29] A copper chromite particle having a silica coating.
- [c30] A copper chromite particle according to claim 29 having a diameter in the range of about 0.25 to about 5 μm .
- [c31] A copper chromite particle having a polymer chemically bonded to, or cross-linked around, the particle.
- [c32] A copper chromite particle according to claim 31 wherein the polymer is chemically bonded to the particle.
- [c33] A copper chromite particle according to claim 31 wherein the polymer comprises from about 5 to about 500 mg m^{-2} of the surface area of the particle.
- [c34] A copper chromite particle according to claim 33 wherein the polymer comprises from about 10 to about 100 mg m^{-2} of the surface area of the particle.

- [c35] A copper chromite particle according to claim 34 wherein the polymer comprises from about 20 to about 100 mg m⁻² of the surface area of the particle.
- [c36] A process for producing a polymer-coated copper chromite particle, which process comprises:
- (a) reacting the particle with a reagent having a functional group capable of reacting with, and bonding to, the particle, and also having a polymerizable or polymerization-initiating group, thereby causing the functional group to react with the particle surface and attach the polymerizable group thereto; and
 - (b) reacting the product of step (a) with at least one monomer or oligomer under conditions effective to cause reaction between the polymerizable or polymerization-initiating group on the particle and the at least one monomer or oligomer, thereby causing the formation of polymer bonded to the particle.
- [c37] A process according to claim 36 wherein the copper chromite particle is coated with silica prior to step (a).
- [c38] A process according to claim 36 wherein the reagent comprises a silane coupling group.
- [c39] A process according to claim 38 wherein the silane coupling group comprises a trialkoxysilane coupling group.

- [c40] A process according to claim 38 wherein the reagent further comprises an amino group.
- [c41] A process according to claim 40 wherein the reagent comprises a N–
[3–(trimethoxysilyl)propyl]–N'–(4–vinylbenzyl)ethylenedia
mine salt.
- [c42] A process according to claim 36 wherein the at least one monomer or oligomer comprises at least one acrylate or methacrylate.
- [c43] A process according to claim 36 wherein the at least one monomer or oligomer comprises lauryl methacrylate or 2–ethylhexyl methacrylate.